Armed Forces College of Medicine

AFCM

Male Genital System III

(Male Accessory Glands)

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INTENDED LEARNING OBJECTIVES (ILO)

By the end of this lecture the student will be able to:

1. **Describe the microscopic structure (LM & EM) of the male accessory genital glands and penis.**
2. **Correlate the microscopic structure of the male accessory genital glands and penis to their functions.**
3. **Interpret the histological changes in the prostate in various diseases**
4. **Describe the structure of the different areas of male urethra**

Lecture Plan

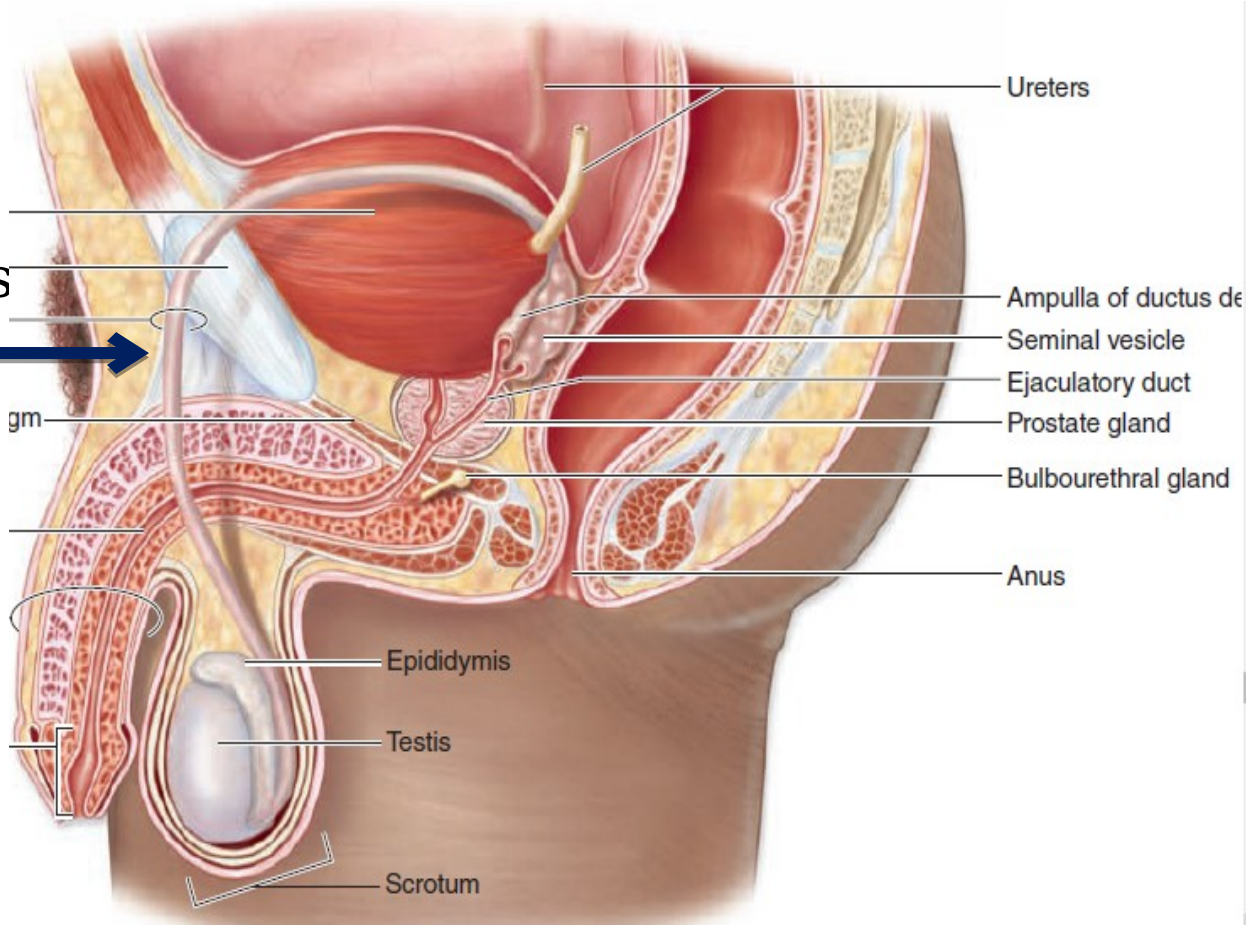
1. Part 1 (5 min)
2. Part 2 (35 min)
3. Part 3 (5 min)
4. Lecture Quiz (5 min)

Male reproductive system

1- **Testis** (sperms & testosterone)

2- **Duct System**:

1-straight tubules
2-Rete testis
3-Efferent ductules
4- Epididymis
5- Vas deferens



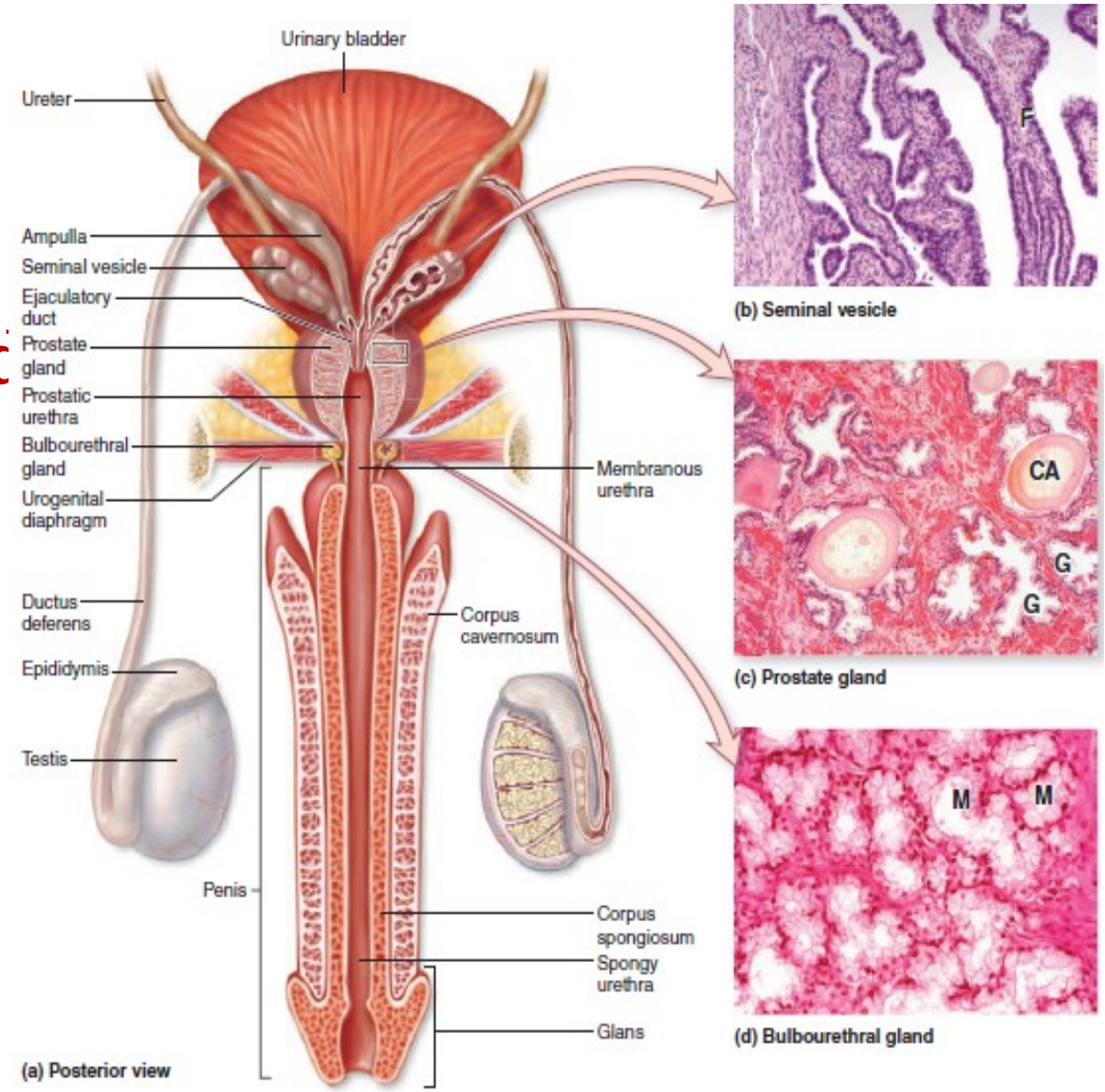
3- Accessory organs

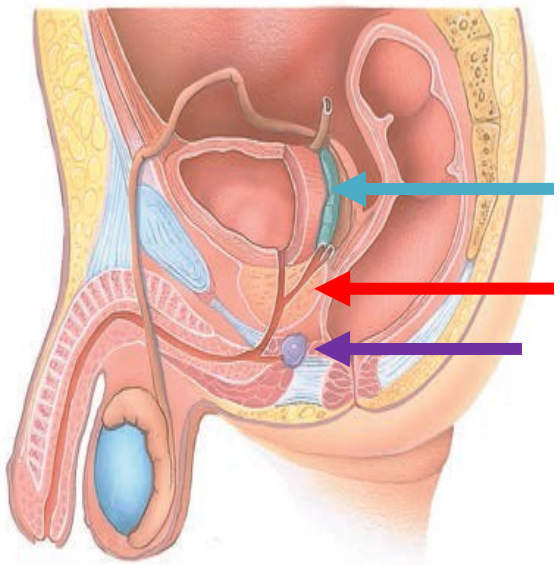
1- Prostate
2- Seminal vesicles
3- Bulborethral gland

4- **Penis**

Accessory glands of male reproductive system

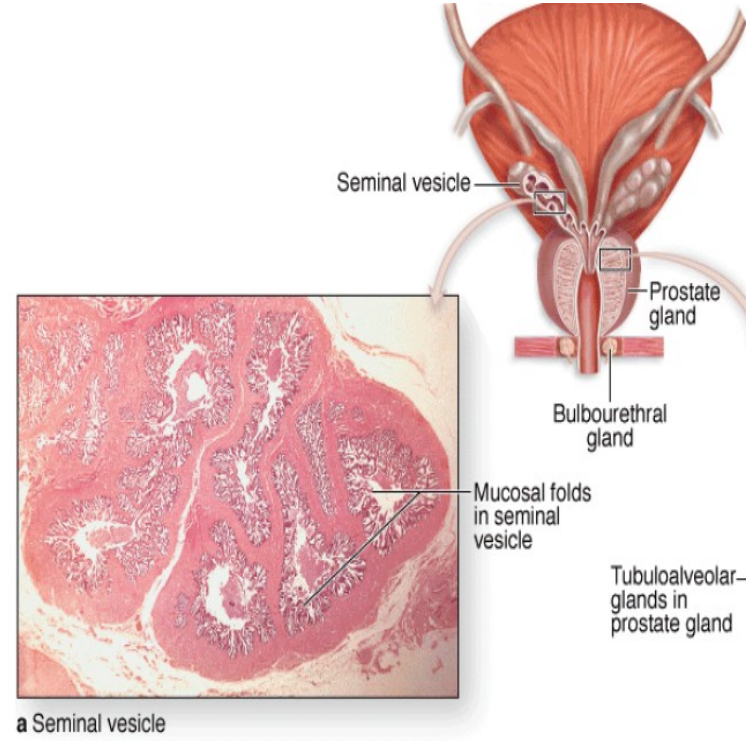
1. Seminal vesicles
2. Prostatic gland
3. Bulbourethral (Cowper's) glands





1. Seminal vesicles

- Consist of **2 highly coiled tubular glands**, adjacent to posterior aspect of bladder.
- The wall of each gland is formed of **mucosa, musculosa & adventitia.**
- **Mucosa: it is highly folded**.
- a) **Epithelium:** simple columnar cells with patches of pseudostratified columnar cells rich in secretory granules.
- b) **Lamina propria** which is rich with elastic fibers.
- **Musculosa:** that is formed of inner circular and outer longitudinal smooth muscles fibers.
- **Adventitia:** formed of fibroelastic C.T.



a Seminal vesicle

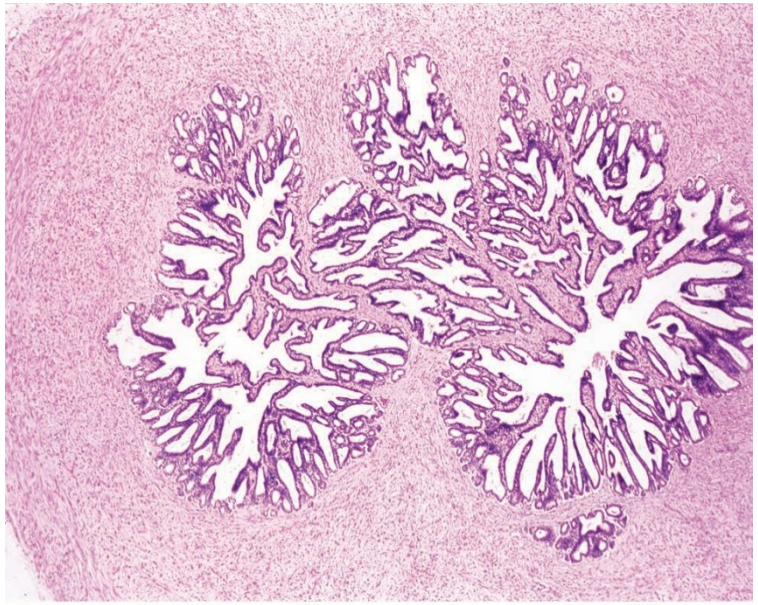
1. Seminal vesicles

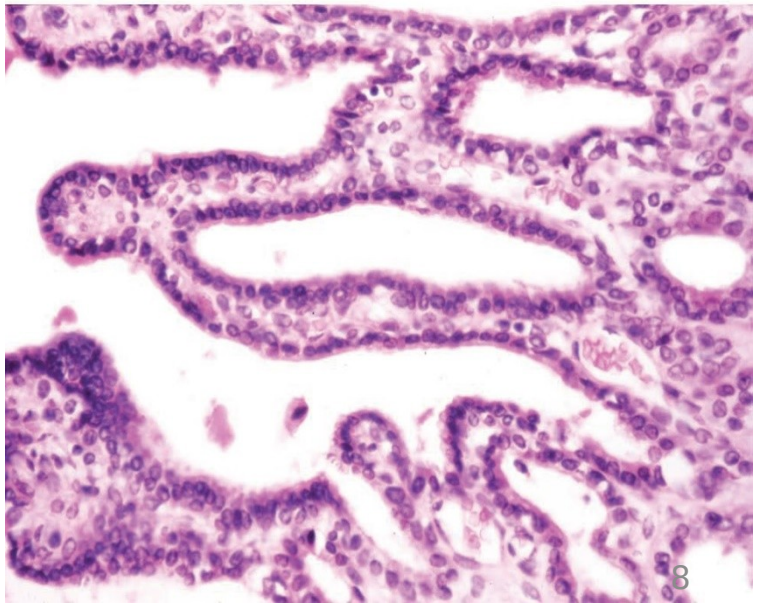
Functions:

Secrete a **viscous yellow** fluid which forms about 70% of the ejaculate.

The secretion is rich in

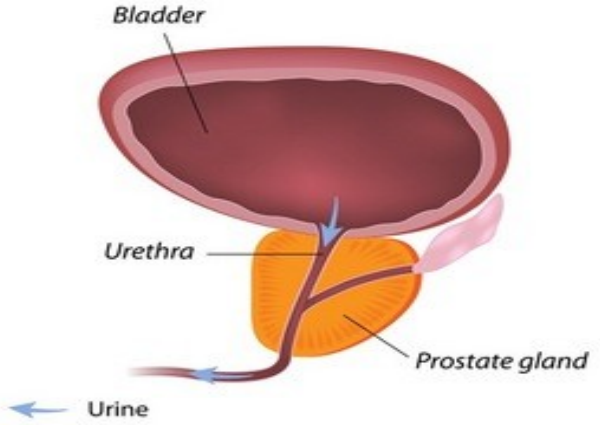
1. **Fructose** which is the main **nutrient** for spermatozoa and is a source of **energy** needed for their motility.
2. **Prostaglandins** which stimulate activity in the female reproductive tract.
3. **Fibrinogens**

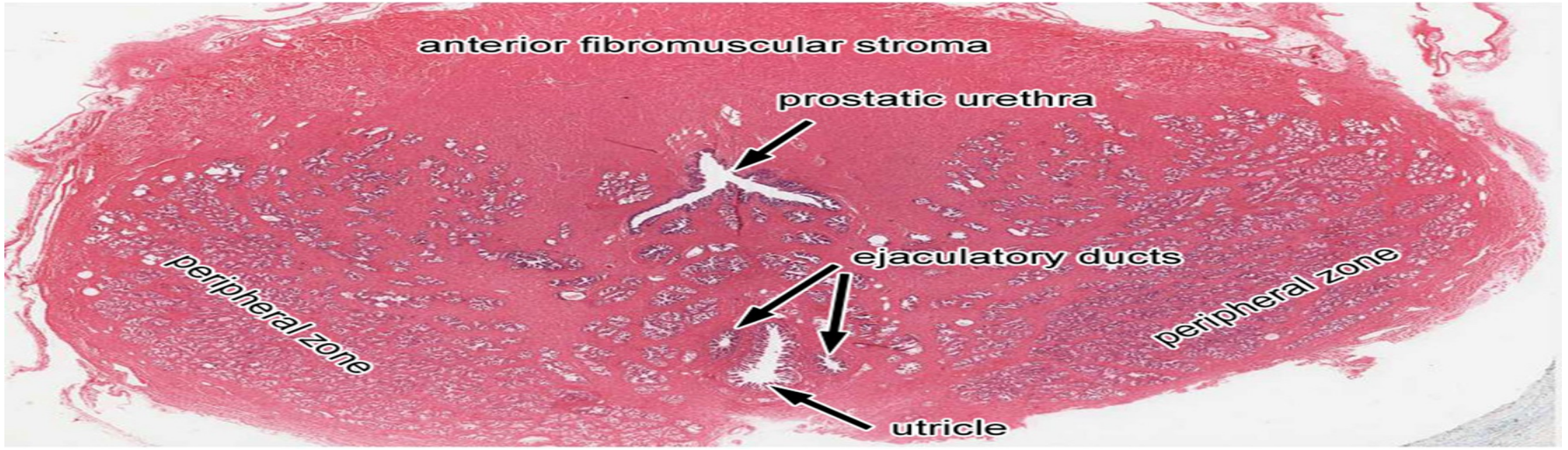




2. Prostate gland

- It is an exocrine compound tubulo-alveolar gland.
- It surrounds first part of urethra.
- It the largest of the accessory glands.
- It is pierced by the urethra and the ejaculatory ducts.
- The lumen of prostatic urethra is V-shaped with its apex directed anteriorly.
- It is formed of stroma & parenchyma of secretory acini.





2. Prostate gland

- **Stroma:**

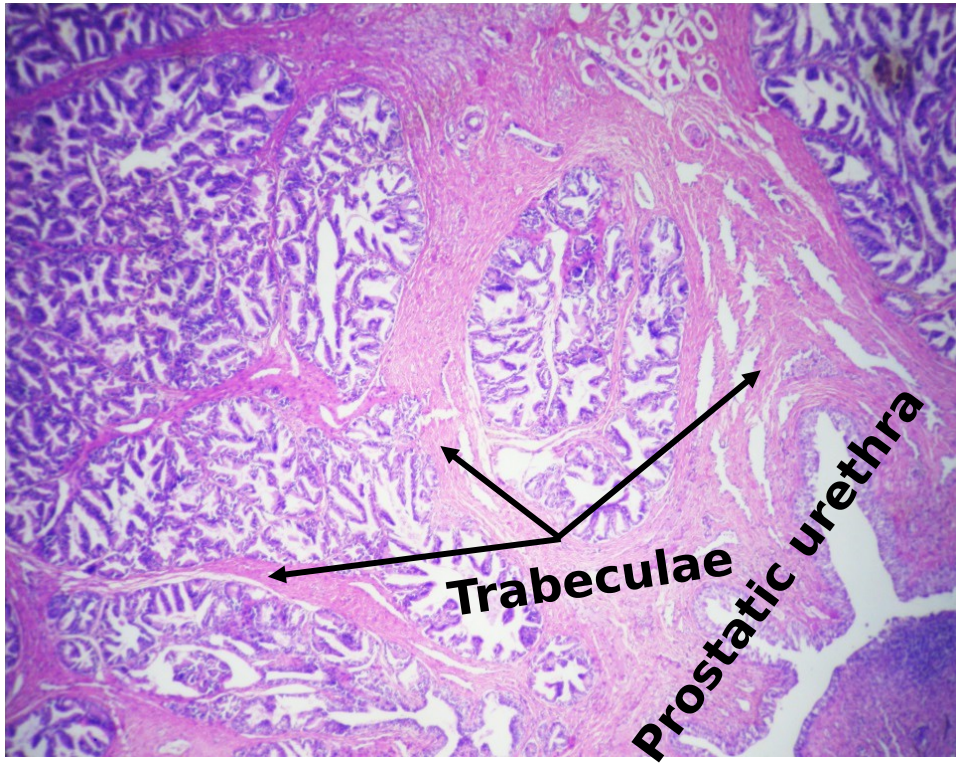
1. Capsule: thin layer of fibroelastic C.T., rich in smooth muscle that contract during ejaculation.

2. Septa:

extend from capsule dividing gland into lobes.

3. Reticular fibers:

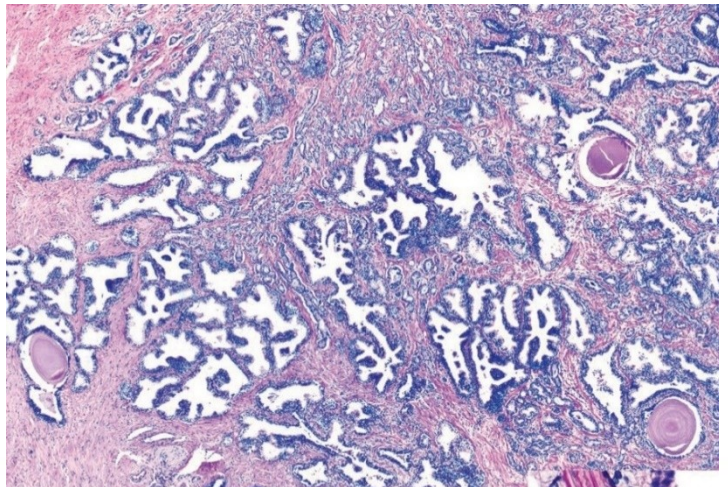
support parenchyma.



2. Prostate gland

- **Parenchyma**

Prostatic glands (tubuloacini) arranged in 3 concentric layers surrounding the prostatic urethra.



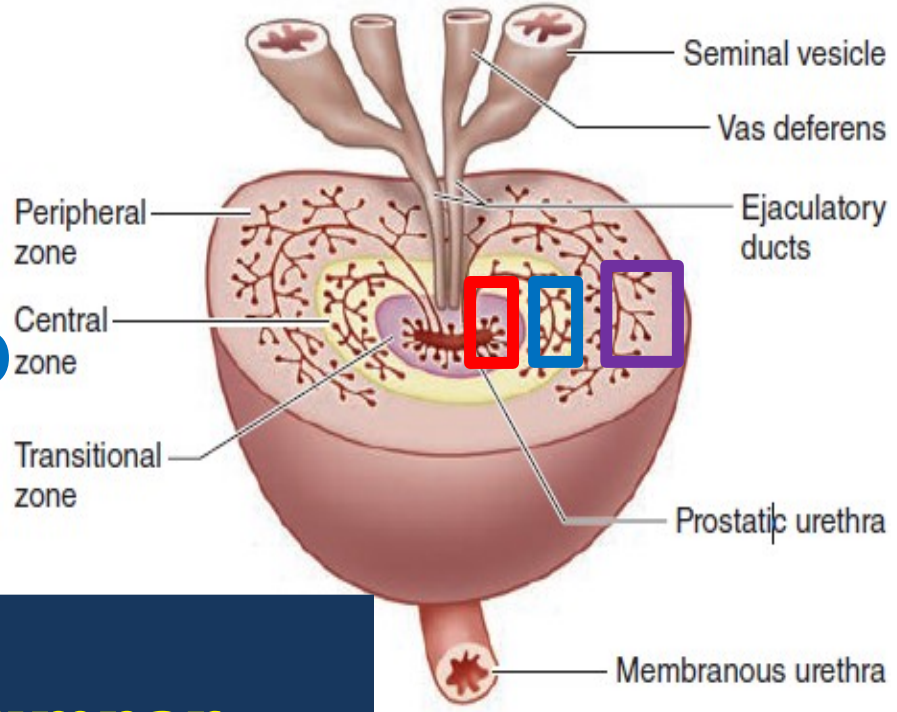
1. Transition zone (5%): (**Periurethral mucosal glands**): **Smallest acini**

2. Central zone (25%): (Submucous glands):

Intermediate with longer ducts.

3- Peripheral zone (70%): (Main glands)

Peripheral, the **largest**, most **numerous**, with the **longest ducts**.

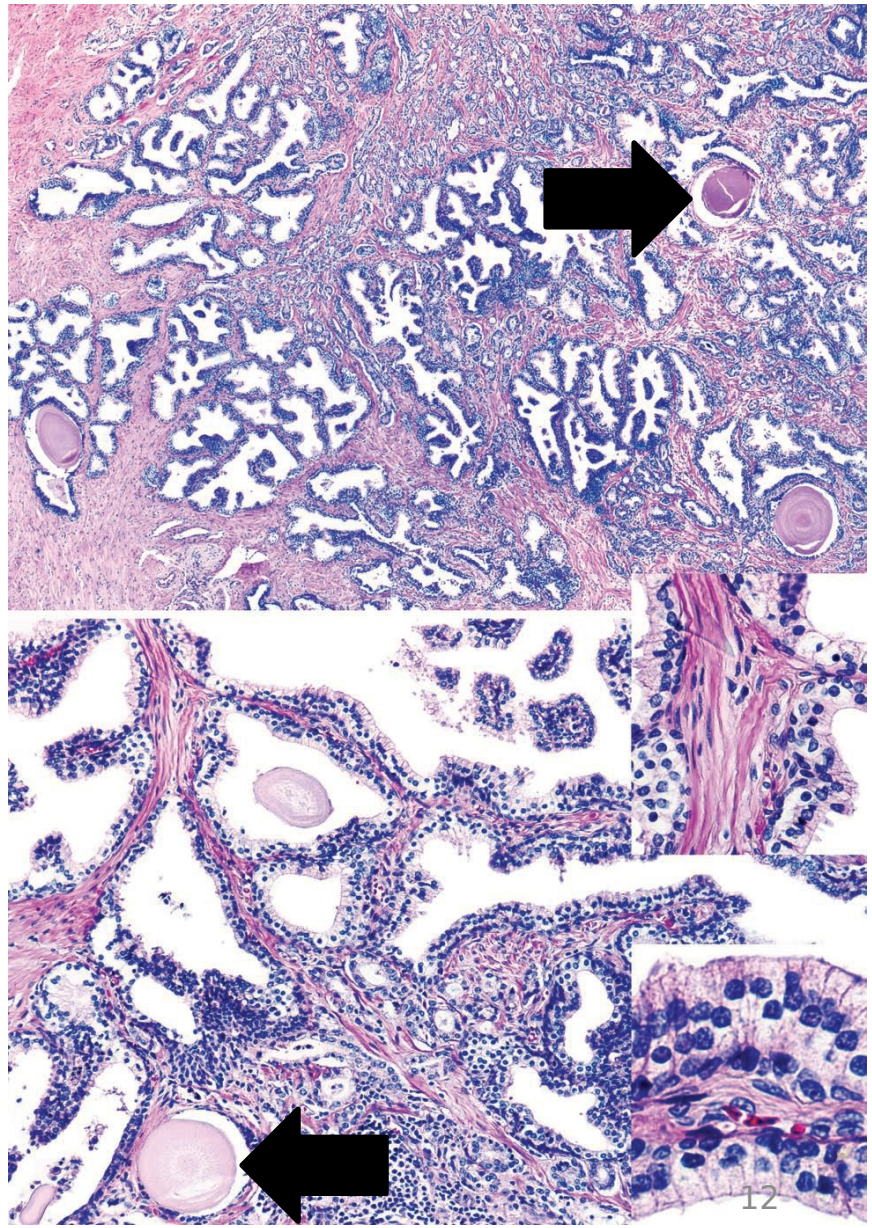


Lining of prostatic glands:
simple columnar or pseudostratified columnar epithelium

2. Prostate gland

➢ **EM:**

Features of protein synthesizing cells abundant **RER**, a well-developed **Golgi** complex, numerous **secretory granules**.



- Lumina of prostatic acini frequently contain small spherical **concretions called corpora amylacea**.
- They are bodies of deposited glycoproteins and keratan sulfate….often **partially calcified**.
- Their number **increases with age** and their significance is not understood.

2. Prostate gland

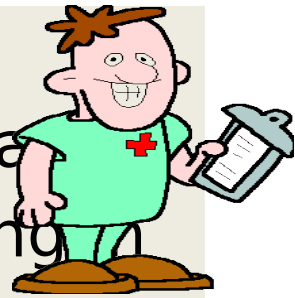
➢ Functions:

1. **Secretion of thin milky fluid rich in exosomes, glycoproteins, enzymes and small molecules such as prostaglandins**
2. **Prostate-specific antigen (PSA) (protease)**

Increased PSA indicate abnormal glandular mucosa typically due to prostatic carcinoma or inflammation)

Synthesis and secretion of prostatic secretions depend on testosterone.

Clinical application:



1. Benign prostatic hypertrophy: as **men age**, the prosta **mucosal and submucosal glands** begin to enlarge resulting difficulties with urination.

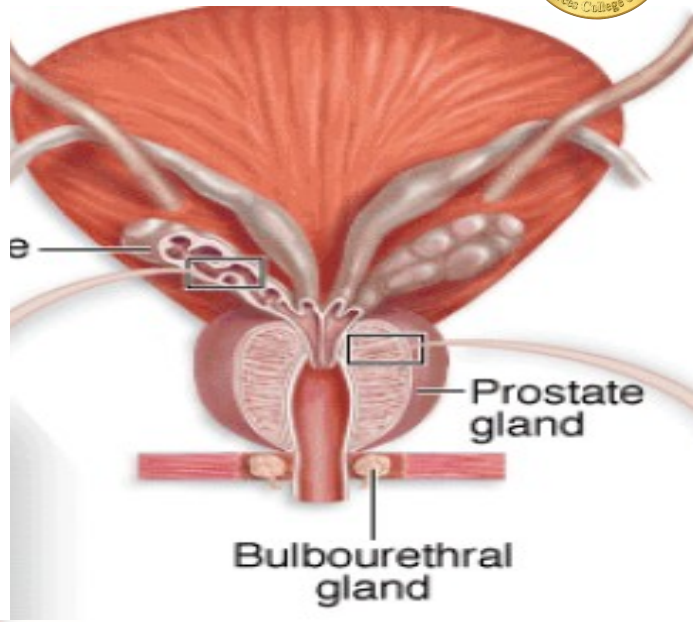
2. Malignant prostatic tumor: is the second common cancer in men occur in the glands of **the peripheral zone.**

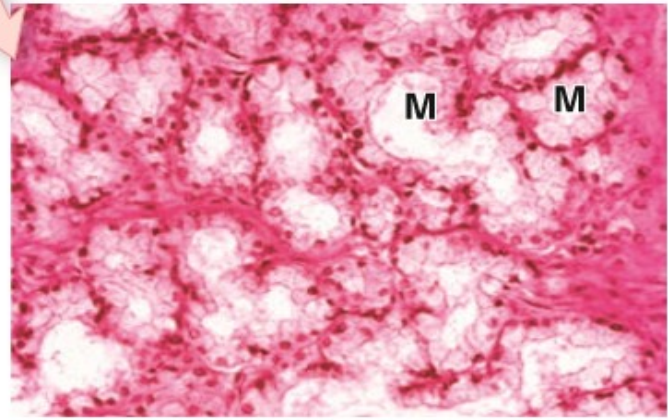
3. Bulbo-urethral (Cowper's) gland

- They are paired rounded and located outside the membranous urethra .
- They empty into the proximal part of the **penile urethra.**
- Glands are **tubule-alveolar** glands, lined by simple cuboidal to simple columnar **mucus secreting cells** surrounded by smooth muscle

➢ **Function:**

Secrete **a viscous mucous** fluid containing galactose and sialic acid to lubricates the lumen of the urethra for passage of the ejaculate.





(d) Bulbourethral gland

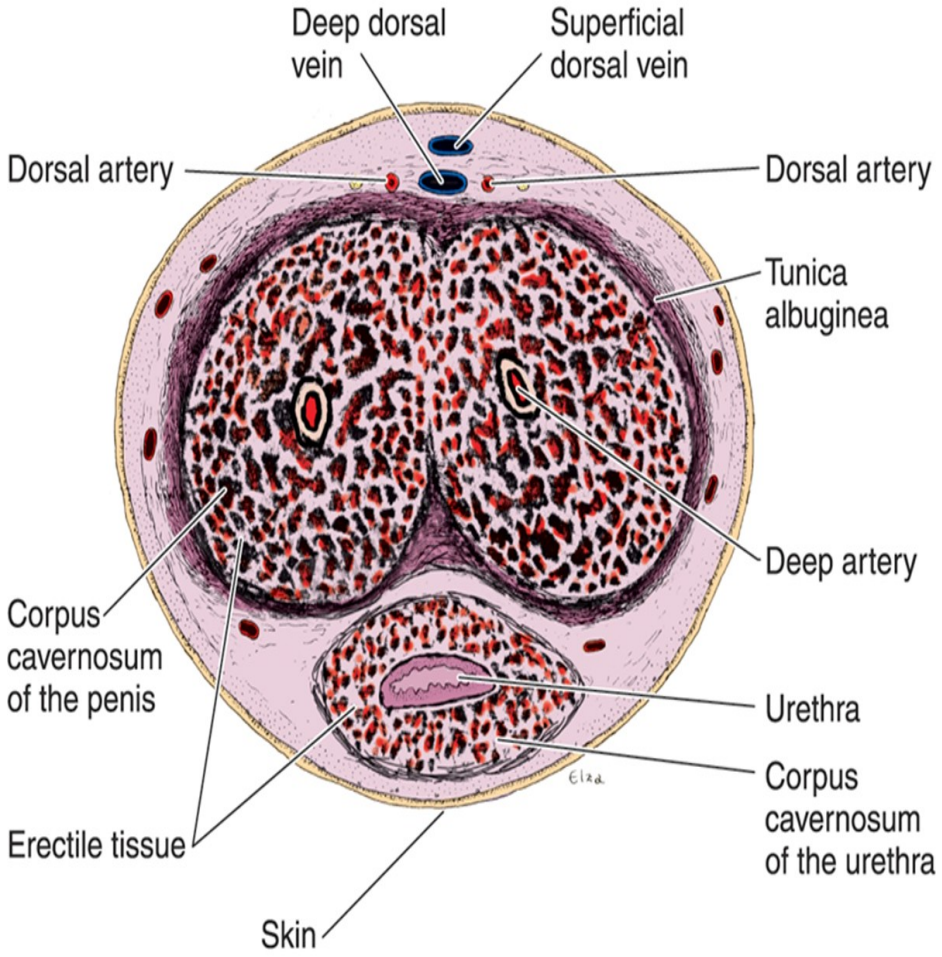
Penis

1-Covering skin: thin pigmented skin with no subcutaneous fat.

2-Three corpora: The body of the penis consists of three cylindrical bodies;

-**Two dorsal corpora cavernosa (central or deep artery)**

-**One ventral corpus spongiosum (penile urethra and terminates by the glans penis)**

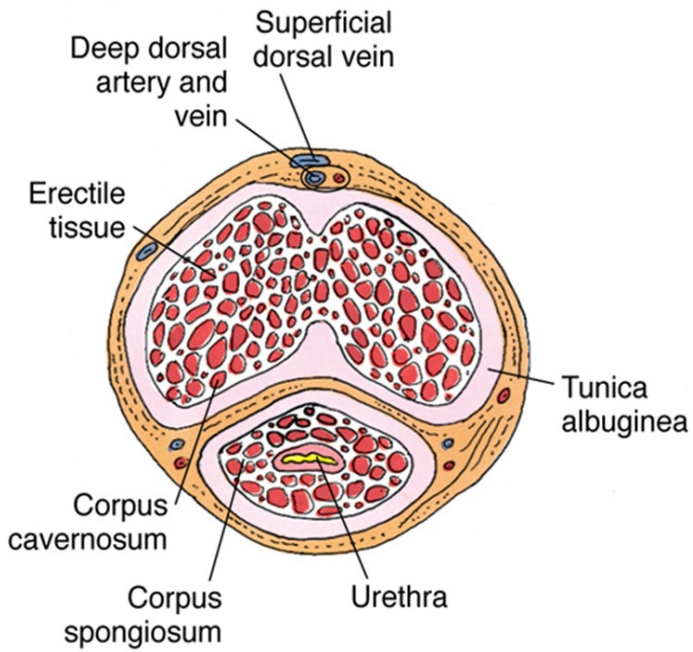


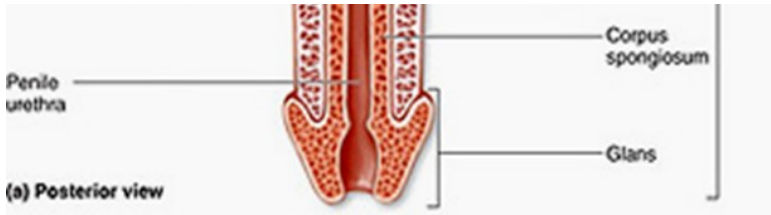
Penis

The corpora are formed of erectile tissue: venous cavernous spaces lined with endothelial cells and separated by trabeculae of collagenous fibers, elastic fibers and **smooth muscle fibers**.

Each corpus is enclosed by a dense C.T. layer called **tunica albuginea**.

The three corpora are surrounded by C.T. layer called **fascia penis**.





- **3-Glans penis: terminal end of corpus spongiosum** and covered by the **prepuce**: a fold of skin which

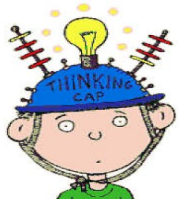
Penile urethra

- **Penile urethra is lined by:**
- Mostly **pseudostratified columnar epithelium**
- In the **glans, it becomes stratified squamous epithelium**

Lining epi. of different parts through which sperms pass

	Lining Epithelium	Smooth
Seminiferous tubule	Spermatogenic cells, Sertoli cells	
Straight tubules (Tubuli Recti)	Fist half by Sertoli cells only Second half simple cubical epi	No
Rete testis	Cuboidal epithelium	No
Ductuli efferentes	Simple columnar ciliated alternating with cuboidal non-ciliated	Present
Ductus epididymis	Pseudo-stratified columnar ciliated epi. 2 types: basal & principal (stereocilia)	Present
Vas deference	Pseudo-stratified columnar ciliated epithelium (sparse stereocilia)	Present
Ejaculatory duct	Simple columnar	No
Urethera: ➢Prostatic ➢Membranous ➢Penile Fossa navicularis	 Transitional Stratified col & pseudo-stratified col Stratified columnar Stratified squamous non-keratinized	Present as Internal uretheral sphincter

Lecture Quiz



Give reasons for:

1- Secondary spermatocytes are rarely seen in the section.

2- Cytoplasmic intercellular bridges between developing spermatogenic cells.

3- Irregularity of the lateral surface of Sertoli cells.

4- Abundant cytoskeleton in Sertoli cells.

5- Secondary spermatocyte contain 23 d-chromosomes.

6- Chromosomes in the cells of secondary spermatocytes are not identical.

7- Concretions are seen in prostatic acini.

8- Prostate enlargement result in urinary problems.

Lecture Quiz

- **As sperm pass through the male genital ducts, proteins and low-molecular-weight products are added from several sources producing semen. Which of the following provides a nutritive, fructose-rich secretion?**

a. Interstitial cells of Leydig
b. Bulbourethral (Cowper) glands
c. Prostate gland
d. Epididymis
e. Seminal vesicles

- **Within the male reproductive tract, stereocilia project from cells lining which of the following regions?**

a. Rete testis
b. Seminiferous tubules
c. Tubuli recti
d. Epididymis
e. Penile urethra

SUGGESTED TEXTBOOKS

1. **Mescher A (2021): Junqueira's Basic Histology, Text and Atlas. 16th Edition. Lange medical books/Mc Graw-Hill.**

2. **Michael H. Ross and WojciechPawlina (2016): Histology A Text and Atlas:, 7th edition.**


THANK
YOU